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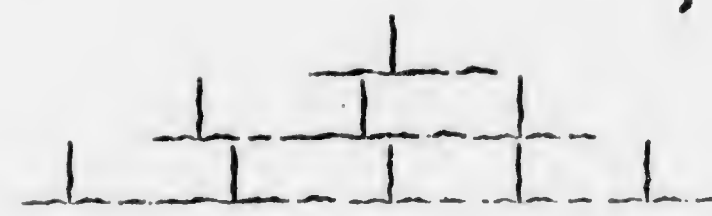
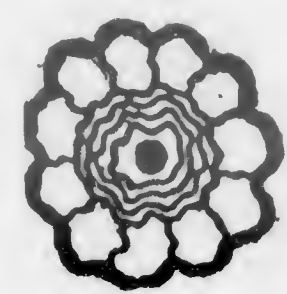
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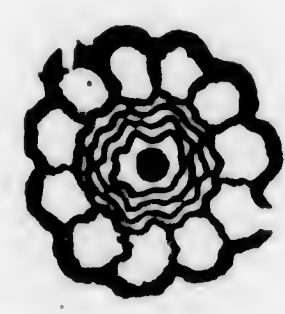
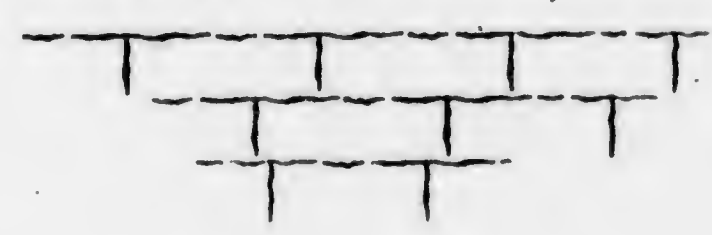


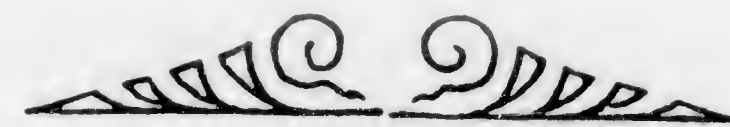
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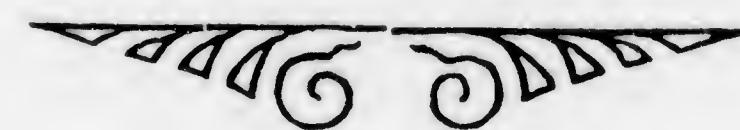
REPORT OF

COMMITTEE ON SANITARY SCIENCE  
AND POLICE

TOGETHER WITH ARTICLES READ  
BEFORE

The Pennsylvania State Veterinary  
Medical Association

HELD MARCH EIGHTH  
1892

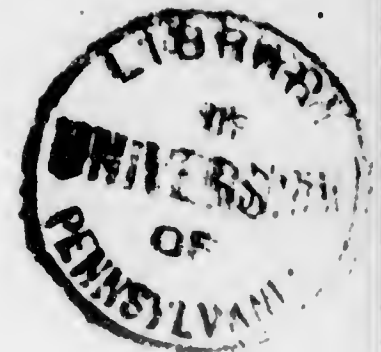


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## Report of Committee on Sanitary Science and Police.

Read before the Meeting by

... PROF. W. L. ZUILL. ...

*Mr. President and Gentlemen :*

**YOUR** Committee on Sanitary Science and Police, recognizing the great importance of the subject upon which they are required to report, the great pecuniary interest which it has for the stock-owners of the State, and the inestimably vital interest which it has in relation to the health of our citizens, cannot fail to be impressed with their utter inefficiency to cope with a question of such magnitude. We therefore crave a leniency in your judgment and criticism, and beg that you will accept this necessarily brief and incomplete report of a few facts that have been brought to our notice. With regard to the diseases of a contagious character prevalent in the State, we can say that in no instance has it come to our notice that any or either of them have prevailed in an enzootic form. Isolated cases of most of these diseases have been reported at more or less infrequent intervals, with the exception of contagious pleuro-pneumonia, which has been entirely eradicated from our soil, as not a single case has been found in this State for several years past. The Pennsylvania State Board of Agriculture alone should receive the credit for the accomplishment of this great work, as their officials had for several years reported the State free of the disease, which statement was not willingly accepted by the national authorities until they had been permitted to make their own investigation, which proved the truth of the claim made by the State ; eager officials, however, are still on the alert, but have succeeded in doing nothing more than to brand with suspicion one or two cases of sporadic pneumonia. These government officials are to be encouraged in their work, as they are sending to the State an efficient police service, which is in itself evidence that the disease would be immediately detected should it be imported from one of

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the few remaining centres of infection in this country. Eternal vigilance is ever a necessity, and applies with double force to this particularly insidious disease, and even should it be exterminated and banished from our soil, no relaxation can be permitted.

The work of this Association, and other kindred bodies throughout the State, is continually acting as a public educator, bringing before the public mind the value and importance of the educated veterinarian, the position which he holds in relation to the public welfare, and the absolute necessity of his association in State and local Boards of Health. That public sentiment is rapidly awakening in this direction is indicated by official appointments of the last few months. The city of Philadelphia has lately provided herself with several inspectors of meats, two of whom are veterinarians, and within a few weeks at least two more will be appointed as milk inspectors. This is a small beginning, but another ten years will find this number greatly multiplied, and my prediction is, that the next decade will find half a hundred veterinarians in official positions in this State. A law of Pennsylvania makes it a crime to be in possession of or to offer for sale or to sell any diseased or unwholesome flesh or food; under this law the city has in the last few weeks obtained a number of convictions, where the flesh of young calves, and tuberculous cattle was offered for sale. Cases are pending where the flesh of actinomy animals was sold, in which it is to be hoped that conviction will also follow. It is quite evident that this law, which forbids the selling of the flesh of tuberculous animals, is equally potent to prevent the selling of the milk from these animals, which is quite as unwholesome as the flesh and much more dangerous to the lives of those partaking of it, and especially with children and invalids. The public is rapidly growing to a full recognition of this vital and important question, and this, in its turn, is stimulating scientists and bacteriologists, and even routine practitioners, in an endeavor to discover a means to certainly diagnose the disease. The advent of tuberculin was hailed with delight by veterinarians. It was hoped that this substance would, beyond peradventure, enable us to establish the presence of tubercular disease in cattle, even in its incipency. We are to be excused for the enthusiastic reception which we gave this remedy. We are to be pardoned for the ecstasy of joy that overwhelmed us when tuberculinum was first given to the public.

Those who are not veterinarians will want to ask why this is so. The answer is simple: It is because of the utter impossibility, in a large number of cases, of making a diagnosis of tubercular disease in cattle from the clinical signs alone, because there is no symptom pathognomonic of the disease in any stage, and because oscultation and percussion has but little value when applied to cattle; and because, when the disease can be

diagnosed by these signs and without the history of the contagion in the herds, then it is of little advantage to us to make the diagnosis, as it has practically done all the harm it can, and the animal will succumb in a short time. These facts are admitted by all veterinarians, and are subscribed to by such men as Schutz, Eggeling, Dicherhoff, John, Rabbie, Bang, Nocard and many others. When such men as these admit the difficulty of making a diagnosis in this disease, and when they themselves make errors in this respect, need we be ashamed to say that we have made mistakes in attempting to diagnose the malady. Egotism of this character would be far more censurable than inability to establish a diagnosis. We, as veterinarians, know that the greatest scourge to the human race originated in, by and with tuberculous milch cattle, and by this means continues to be disseminated and spread throughout the world. Facts indicate tuberculous cattle to be a fruitful centre for the spread of the disease. We know that by them, and also by the food products which comes from them, that the disease is spread throughout the entire human family, or that portion of it which consumes the flesh and milk of this animal. It is an indisputable fact that tubercular disease is always found among those people, civilized or savage, who use the flesh and milk of cattle as food. It is also indisputable that it is not found among those people who do not use it as food, whether they be savage or civilized. That the association of these facts is not proof that the disease is transmitted from cattle to man, this we admit; but it does constitute a circumstantial evidence so strong that the medical profession of the world has almost unanimously brought in a verdict of GUILTY IN THE FIRST DEGREE.

Few will dispute this fact in the face of the overwhelming testimony that can be brought to support it; that phthisis is a disease acquired from the bovine race.

It is true beyond any question that the only people on the face of the earth who enjoy absolute immunity from phthisis are those who are not in possession of the domestic cow. It is therefore of vital importance to the human race that this disease—*tuberculosis*—be completely eradicated from among our herds. As long as it exists, it will always be a centre and source of infection from which to disseminate itself throughout the human race.

The diagnostic value of tuberculin is recognized, but it has disadvantages, one of which is the difficulty of obtaining the fluid of a given strength, or administration in a known dose.

A long line of laboratory investigation led Prof. Samuel G. Dixon to experiment with kreatin and other amides in tubercular animals, and with whom your chairman of the Sanitary Committee has the good fortune to be associated. Our experiments have so far been entirely



satisfactory, as the salts of this group have given more or less reaction in all cases of tubercular disease, and not the slightest reaction in any case of check experiment. These experiments have only been going on since the 13th of August last, and have not yet begun to approach completion. The results are apparently so satisfactory that the facts, so far as obtained, have been given to the public, but no claim of any kind is made for them. I have therefore taken the liberty to incorporate in this report the clinical facts of these experiments so far as obtained, and which are as follows:

### Reaction of the Amide-Group upon the Wasting Animal Economy.

BY PROFS. SAMUEL G. DIXON, M.D., AND  
W. L. ZUILL, M.D., D.V.S.

Academy of Natural Sciences of Philadelphia.

In 1889 I demonstrated that the tubercle bacillus and its nidus, when injected into the animal economy, produced an effect before unobserved.

In former communications I have been quite indefinite in my statements as to the real character of this toxic agent, having only suggested that it might be the residue of the pabulum remaining after the bacilli had selected that which was necessary for their existence, or a digestive secretion of the bacillus; or, again, that it might be an excretion of this living organism. However, in my endeavor to determine the true nature of the active principle of the indefinite mixture that others have entitled "tuberculin," I produced a crystalline substance that at once suggested the amide-group: Allantoin, glycocin, tyrosin, kreatin and kreatinin, taurin and cystin, etc. With this fact directly before us, that the wasting economy, accompanied by a defective liver and weak excretory organs, is often loaded up with waste products, it was believed worth while to institute a line of physio-pathological experiments by injecting the respective members of the amide-group into tuberculous animals. Kreatin being at hand, I at once injected a small quantity of its solution into tuberculous and healthy small animals, with as satisfactory results as are usually obtained with Guinea-pigs and rabbits. However, owing to the fact that these animals do not give entirely satisfactory reactions, W. L. Zuill, M.D., Professor of Veterinary Surgery in the University of Pennsylvania, kindly offered to assist in carrying out a line of physio-pathological experiments on the larger animals. His clinical experience, particularly with tuberculous cattle, made his services specially valuable in this work. A line of experiments was, therefore, immediately planned, and Prof. Zuill began the experiments to test the physio-pathological action of the respective members of the amide-group, when subcutaneously injected into the tuberculous animal economy, as well as into those in health, for control experiments. The report of Prof. Zuill on his work up to the present time is as shown in the following communication:

To Prof. Samuel G. Dixon, M. D.

DEAR DOCTOR:—I hereby submit to you the clinical results obtained from the subcutaneous injection of kreatin in tuberculous cattle. The experiments were made in accordance with our pre-arranged plan, and have extended over the last two months. The results obtained in these experiments more than fulfil my utmost expectations, and are in every respect identical with

those which I have obtained with tuberculin. The physiological action of kreatin in tuberculous cows is so exact and identical with tuberculin that it is impossible to recognize a clinical difference. Its influence upon circulation and respiration is well marked in animals suffering with miliary tuberculosis of the lungs; but large doses of the drug do not react upon these organs should the disease be confined to the other tissues of the body.

The action of kreatin upon tuberculous tissues is intensely energetic, causing rapid necrosis of this tissue, giving it the appearance of having undergone a cystic degeneration. The cheesy degeneration of tuberculous tissue seemingly disappears, and its place is taken by necrotic cavities filled with serum, in which float threads and masses of the tuberculous structure more or less large.

August 13.—Experiment No. I was made with 1-20 of a grain of kreatin in a tuberculous cow with no well-marked reaction.

August 27.—Experiment No. II was made with 1-6 of a grain of kreatin in a tuberculous cow, which caused an elevation of temperature from 101° to 104 1-5° F.

September 9.—Experiment No. III was made with 1/2 of a grain of kreatin in a tuberculous cow, and caused an elevation of temperature from 101 1-5° to 103 4-5° F.

September 21.—Experiment No. IV was made with 1 grain of kreatin in a tuberculous cow, and caused a reaction in temperature from 102 1-5° to 105 3-5° F.

September 4.—Check experiment No. II was made with 1-6 of a grain of kreatin in a healthy cow, and no reaction could be observed.

September 9.—Check experiment No. III was made with 1/2 of a grain of kreatin in a healthy cow, and no reaction could be observed.

September 24.—Check experiment No. IV was made with 1 grain of kreatin in a healthy cow, and no reaction could be observed.

Respectfully,  
W. L. ZUILL.

The report is so satisfactory in showing a marked action of one of the amide-group on wasting animals, when subcutaneously injected, that not only will the chemical work to determine the exact character of the definite crystalline substance obtained from animal tissues and artificially prepared culture mediums be carried on, but also a full line of physio-pathological experiments by the subcutaneous injection of the respective members of the amide-group into the animal economy, in the Bacteriological Laboratory of the Academy of Natural Sciences of Philadelphia, such as its facilities will warrant.

### Action of the Amide-Group upon the Wasting Animal Economy.

In carrying out the physio-pathological experiments by the subcutaneous injection of the respective members of the amide-group into the wasting animal economy, kreatin was followed up by taurin, with the results shown in the accompanying report, made by Dr. Zuill, Professor of Veterinary Surgery in the University of Pennsylvania:

October 9, 1891.

To Prof. Samuel G. Dixon, M. D.

DEAR DOCTOR:—I hereby submit to you the clinical results obtained from the subcutaneous injection of taurin into tuberculous cattle.

The experiments were made as nearly in accordance with your request as was possible; however, the stock under my control for the purpose was not as satisfactory as I would have liked.

Experiment No. 1A, was made upon a full-grown heifer, that was previously used for the purpose of testing the action of both tuberculin and kreatin; therefore, you will not look for as marked reaction as would likely take place under other conditions.



Treated with  $\frac{1}{2}$  grain of taurin.

TEMPERATURE.			
10 A.M.	102.0° F.	7 P.M.	104.0° F.
1 P.M.	102.2 "	8 "	104. "
2 "	102.2 "	9 "	104. "
4 "	102.2 "	10 "	103.8 "
6 "	104.2 "	11 "	103. "

Control Experiment No. 1A, unfortunately, had to be made with a healthy steer, only six months old, which fact, for obvious reasons, rendered the result less satisfactory than it would have been with a full-grown animal.

Treated with  $\frac{1}{2}$  grain of taurin.

TEMPERATURE.			
10 A.M.	101.6° F.	6 P.M.	102.0° F.
1 P.M.	101.8 "	8 "	103. "
2 "	101.8 "	9 "	103. "
4 "	101.8 "	10 "	101.8 "

Experiment No. 2A, was made upon the same tuberculous heifer as was Experiment No. 1A; therefore, you would not look for as high a reaction as that shown by the first injections, particularly when followed up in such close succession.

Treated with 1 grain of taurin.

TEMPERATURE.			
10 A.M.	102.0° F.	5 P.M.	102.6° F.
12 M.	102.2 "	6 "	103. "
2 P.M.	102.2 "	7 "	103.8 "
4 "	102.4 "	8 "	103.6 "
	9 P.M.		103.2° F.

Control Experiment No. 2A, was made on the same healthy cow as Experiment No. 2 of September 4, 1891.

Treated with 1 grain of taurin.

TEMPERATURE.			
10 A.M.	101.8° F.	5 P.M.	101.6° F.
12 M.	102. "	6 "	101.6 "
2 P.M.	102. "	7 "	101.6 "
4 "	101.8 "	8 "	101.6 "
	9 P.M.		101.6° F.

Experiment No. 3A, was made with the same tuberculous heifer that I have been using to test the reaction of both tuberculin and kreatin, which renders the animal less susceptible to the action of taurin.

Treated with  $\frac{1}{2}$  grains of taurin.

TEMPERATURE.			
9 45 A.M.	101.4° F.	5 P.M.	103.0° F.
12 M.	102. "	6 "	103. "
2 P.M.	102.4 "	7 "	103.6 "
3 "	102.8 "	8 "	103.2 "
4 "	102.8 "	9 "	102.8 "

Control Experiment No. 3A, was made on a healthy cow, by treating her with  $\frac{1}{2}$  grains of taurin.

TEMPERATURE.			
9 45 A.M.	100.8° F.	5 P.M.	102.0° F.
12 M.	100.8 "	6 "	102.2 "
2 P.M.	100.8 "	7 "	102.2 "
3 "	102. "	8 "	101.6 "
4 "	102. "	9 "	101.6 "

Hoping to have some new cattle for the next amide-group, I remain,

Very truly,

W. L. ZUILL.

## Action of the Amide-Group upon the Wasting Animal Economy.

The physio-pathological experiments with kreatin on the healthy and wasting animal economy were followed up by others upon taurin, with the results heretofore reported.

January 22, 1892.

To Prof. Samuel G. Dixon, M.D.

DEAR DOCTOR:—At your request I have used kreatin, taurin, the toxic agent you extracted from tuberculous lungs and tuberculin, as diagnostic agents, with the following results:  
Cow condemned for tuberculosis treated with 1 grain of kreatin.

TEMPERATURE.			
11 A.M.	101.6° F.	7 P.M.	102.4° F.
1.15 P.M.	102. "	8 "	102.4 "
2.30 "	102.1 "	10.30 "	101.6 "
6 "	102.4 "	11.30 "	101.6 "

Same animal treated with 1 grain of taurin.

TEMPERATURE.			
9 A.M.	102.2° F.	5.30 P.M.	102.4° F.
11 "	102.1 "	7.30 "	102.6 "
1.30 P.M.	102. "	9.30 "	102.6 "
3.30 "	102.1 "	8 A.M.	101. "

Same animal treated with tuberculous toxic agent, prepared according to Dixon,  $\frac{1}{2}$  grain.

TEMPERATURE.			
8.55 A.M.	102.4° F.	3.15 P.M.	102.3° F.
10.35 "	102.6 "	4.30 "	102.4 "
1 P.M.	102.4 "	7.30 "	102.6 "

Same animal treated with tuberculin, 400 mgs.

TEMPERATURE.			
12.50 P.M.	101.8° F.	5.30 P.M.	102.2° F.
2 "	101.8 "	6.50 "	102.2 "
3.15 "	102. "	8.15 "	102.4 "
4.15 "	102.2 "	9 "	102. "

The results from the reagents not being consistent with our former experiments on tuberculous animals, the cow was killed and posted so as to determine the exact condition. This demonstrated a non-tuberculous condition.

W. L. ZUILL.

During the year there has been a marked decrease in the number of outbreaks of Texas or splenic fever, for which we have again to thank the Bureau of Animal Industry, for regulating the transportation of Texas cattle, east and south of the following counties—Parmer, Castor, Swisher, Brisco, Hall, Childers, Geer and the States of Arkansas, Louisiana, Tennessee, North Carolina and Florida, prohibiting the movement of cattle from these places from the 1st of March to the 1st of November, except under strict railroad regulations. These prohibit Texas cattle from being fed or watered, or mixed with other stock, in transit, or stock yards, and that all cars, pens, etc., where such stock has been, shall be thoroughly disinfected. During the year, there were reported but twelve outbreaks of this disease, which is thirteen less than the year before, and thirty-five less than the year before that.

### Actinomycosis.

This disease seems to be rather on the increase. Such cases, when found, are condemned as contagious, and unfit for human food. The city authorities have, since our last meeting, appointed meat inspectors, who also condemn cattle affected with this disease as unfit for food.

### Glanders.

During the year there has been reported seventy-five outbreaks of glanders, which have been investigated. Where glanders were found to exist, the diseased were destroyed and the exposed quarantined, the stables disinfected. Sixteen of the cases were due to other diseases. Fifty-nine were glanders.

In this disease, as with tuberculosis, there has been an earnest effort made to discover a diagnostic agent, and much valuable work has been done in this direction, not only in Europe, but also in this country, even in this very city, the home of American medical science. These investigations have been made by one of the most earnest members of our profession, and an applicant for membership in our Association. It is sufficient for me to say that Dr. Pearson's experiments with maline have been referred to by all the leading veterinary journals of the world, and have been quoted by all the recent writers on this question.

### Swine Diseases.

Swine diseases seem to have been on the decrease, probably owing to the work of the Bureau of Animal Industry. Fifty-nine herds being reported as affected, against one hundred and sixty the year previous.

### Foot and Mouth Disease.

During the months of September and October, we had reported 275 herds as being affected with this disease. Total number of cattle in these herds, 4950. Total number affected, 1100; average four per herd. Showing at once that the disease was not the dreaded "English foot and mouth disease," but was due to some vegetable parasite, or fungus, in the pasture. Cattle which were not out on pasture did not become affected. Had it been genuine foot and mouth disease, very few of the cattle would have escaped, and it would have spread to adjoining herds, which it did not.

### Anthrax.

We have had comparatively few cases of anthrax reported during the year. The weather during August and September not being favorable to the production of this disease; a few cases only being reported, from Berks, Bedford and Washington counties. After the cattle were removed from swamp pasture to higher land, the disease subsided.

### Rabies.

There has been but few cases of rabies reported during the year—ten outbreaks only having been reported, five cases of which were acute indigestion, four cases of vertigo, and one well-marked outbreak of rabies in a herd of cattle. Four cows having been bitten by a strange dog two weeks previous, two of the animals died in spasms, the other two were attacked with spasms the next day, and were at once destroyed.

### Domestic Animals Healthy.

The general health during the year of the domestic animals of this State has been unusually good, and veterinary surgeons have had no reason to complain of being over-worked.

Respectfully submitted by,

W. L. ZUILL.

FRANCIS BRIDGE.

For the Committee.



## Arytenectomy (Laryngotomy) for Roaring.

Read before the Pennsylvania State Veterinary Medical Association, College of Physicians, Philadelphia,

BY SIMON J. J. HARGER, V. M. D.,

Professor of Anatomy and Zootechnics in the Veterinary Department of the University of Pennsylvania.

The subject Anomalies in Anatomy was originally assigned to me by our President. But it being, perhaps, too theoretical and abstract for a practical organization like this, I substituted for it, at his request, that of *laryngotomy*, or, better, *arytenectomy*. A number of cases, successful and unsuccessful, have from time to time been reported in journals, but little has been said in English upon the details of the operation, whereby the general practitioner can become thoroughly familiar with it. Besides, it would seem to me that the true value of the operation is not generally appreciated by the American veterinarian, and that its disrepute is largely due to over-zealous operators and incorrect details of the *modus operandi*. I now refer especially to excision of the left arytenoid cartilage, from paralysis of the corresponding laryngeal muscles.

The larynx is composed of five pieces of cartilage, maintained in position by articulations, special ligaments and muscles. Its interior, lined by mucous membrane, presents a superior opening or entrance of the shape of an equilateral triangle, circumscribed by the base of the epiglottis, the ary-epiglottic folds and the superior extremity of the arytenoid cartilages. The lower opening or glottis is diamond-shaped and circumscribed, antero-laterally, by the vocal cords, two membranous folds extending from the body of the thyroid cartilage to the anterior border of the arytenoid; postero-laterally by the arytenoids. Of the five pairs of intrinsic muscles, only two, the posterior crico-arytenoid, a large quadrilateral muscle, and the arytenoideus are dilators of the glottis. Hence, any interference with the function of these muscles will correspondingly

modify the movements of the vocal cords and the arytenoids, and the size of the glottis, and produce abnormal alterations in respiration. The greatest width of the glottis at rest is 2 to 2.5 cm.; during exercise it is twice this dimension.

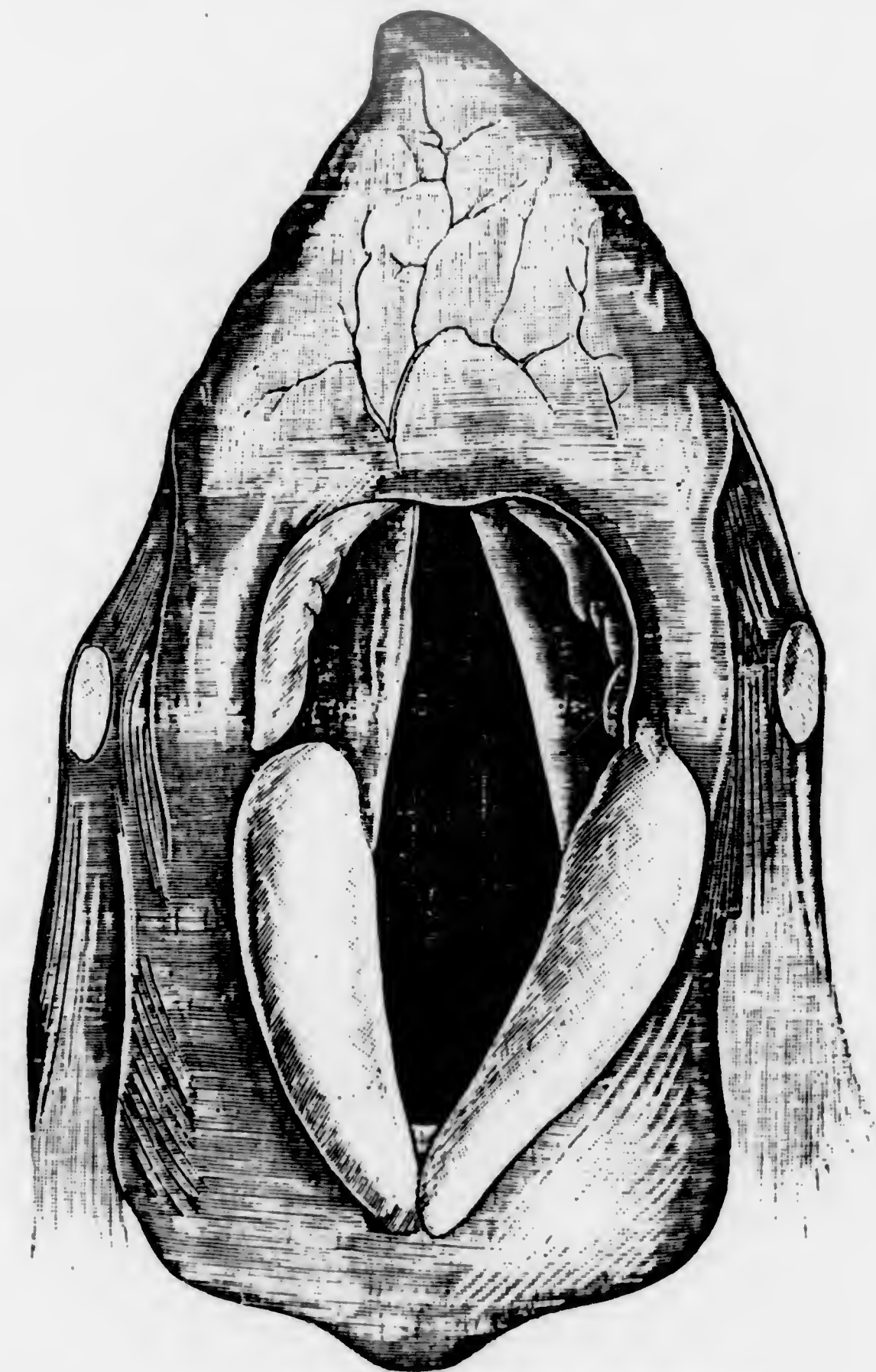


FIG. 1. Superior view of larynx from a roarer.

The nervous supply comes from two nerves—the superior laryngeal, giving sensibility to the mucous membrane. The inferior laryngeal or recurrent, supplies all the laryngeal muscles with motion, excepting one, the crico-thyroid; the latter is supplied by a branch from the superior



laryngeal, or even the vagus itself. Of course, we will remember the difference in the origin of the two recurrent nerves, the right leaving the vagus at the anterior extremity of the thoracic cavity, the left at the base of the heart. The left recurrent, passing through the mass of mediastinal and bronchial lymphatic glands, is much more exposed to the influence of alterations in the thorax, which explains the almost invariable left-sided paralysis. I have several times made section of the left recurrent nerve and produced well-marked muscular atrophy, and roaring in from three to four weeks. It has been conclusively proved by Dr. L. Breisacher, in experiments upon the horse, that section of the superior laryngeal nerve is not followed by paralysis and atrophy of the muscles on the corresponding side, and that this nerve does not contain the so-called *trophie* fibres. Nor has the first cervical pair, as advanced by Möller, of Berlin, any physiological relation with the muscular contraction of the larynx.

Left-sided muscular paralysis I have often seen on the dissecting table, and can be easily recognized. The left muscles, excepting the cricothyroid, are atrophied to a variable degree, pale and often scarcely more than fibrous tissue and fat. The larynx appears one-sided, the corresponding arytenoid and vocal cord are motionless, flabby, fallen inward and downward toward the median line, making the glottis smaller, assymetrical, and straight on the affected side, and thus offer an obstruction to the passage of the air. The posterior crico-arytenoid is the first one to show the effects of atrophy and fatty degeneration (Fig. 1).

The cause of this muscular degeneration is nearly always a loss of conductivity of the left recurrent nerve from compression by adventitious growths along its course, and enlarged mediastinal lymph glands from diseases of the thoracic organs, as pneumonia, pleurisy, etc.; sometimes no special alteration is visible. At other times the glottis is narrowed by a perichondritis of the arytenoids, and fibroid thickening of the mucous membrane, of which a few cases have been mentioned.

With these preliminary remarks, it is easy to comprehend that the principal cause of roaring is a diminution of the lumen of the larynx, and it is little more than the application of common sense that, knowing the alterations and their effects, the treatment should be directed toward the enlargement of this opening. In fact, it is due more to the falling inward of the upper extremity of the arytenoid cartilage from its own weight and the pressure of the inspired air on its outer surface than to an absolute narrowing of the glottis that roaring is produced.

The operative treatment of laryngismus paralyticus, since its first institution by Günther, in 1845, has undergone various modifications, and was almost abandoned twenty-seven years ago. The vocal cords, the lateral ventricle, sometimes both of these structures, the anterior

extremity and the posterior extremity of the arytenoid cartilage were successively removed, with unfavorable results. The operation described in Fleming's little book, and consisting of excision of both the vocal cord and the arytenoid, cannot be recommended (Fig. 2). It produces too

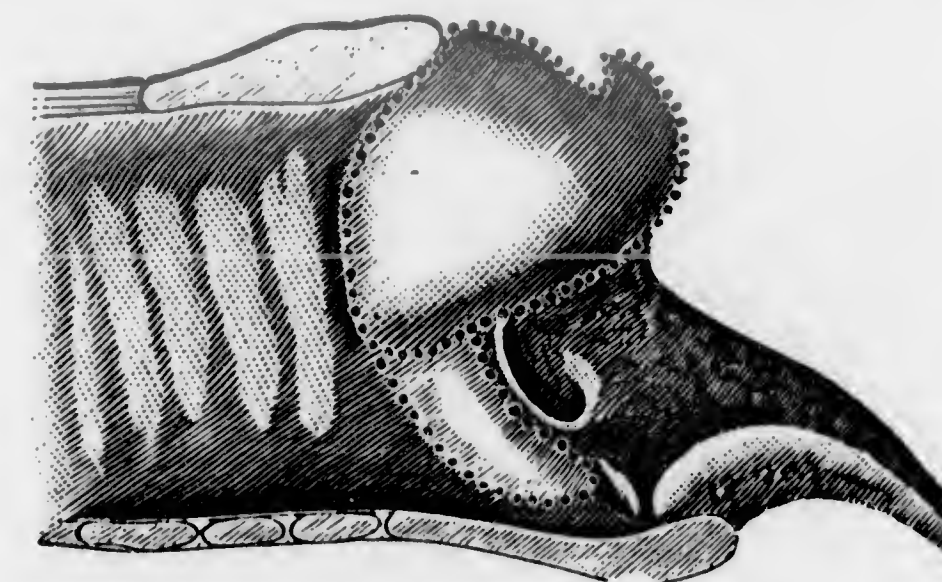


FIG. 2. Fleming's operation. Vertical section of larynx. The dotted lines indicate the line of incision for the removal of the arytenoid cartilage and the vocal cord.

large an intra-laryngeal wound; not only from my own experience, but also from that of other American surgeons, exuberant granulations are too often a complication and make the symptoms more grave after than before the operation. "Proud-flesh" in the larynx, when once formed, is most persistent. Partial excision, on account of the continual movements during respiration, of the part which remains in situ, predisposes to the same effects. In one case, in particular, I inserted a closely-fitting

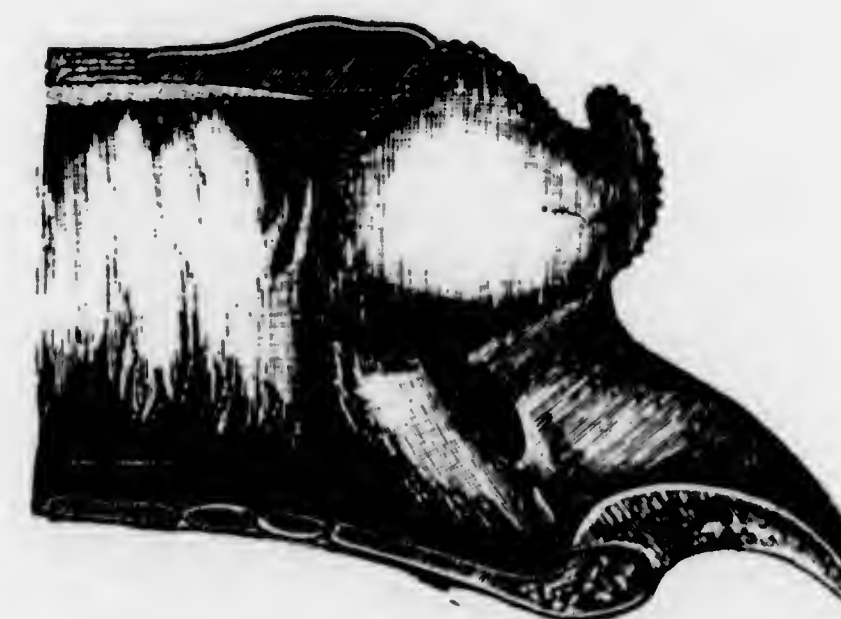


FIG. 3.

silver tube into the internal cavity of the larynx, thinking that equable pressure would prevent its growth, but without success. The only procedure in my judgment recommendable is complete, or almost complete, excision of the arytenoid cartilage on the affected side (Fig. 3),



which has of late years been revived by Professor Möller, of Berlin, and with which, considering the small number of cases, I have obtained good results.

The details of the operation are as follows: The patient, having been cast, is chloroformed, which greatly facilitates the operation and renders it painless. The animal's struggling would be a great inconvenience to the operator. The chloroform is administered drop by drop upon a piece of flannel placed over the nostrils. The animal is maintained on his back either by ropes or by packing with bundles of straw. The operator,



FIG. 4. Razor-shaped Bistoury.



FIG. 5. Angularly-curved Bistoury.



FIG. 6. Curved Needle.

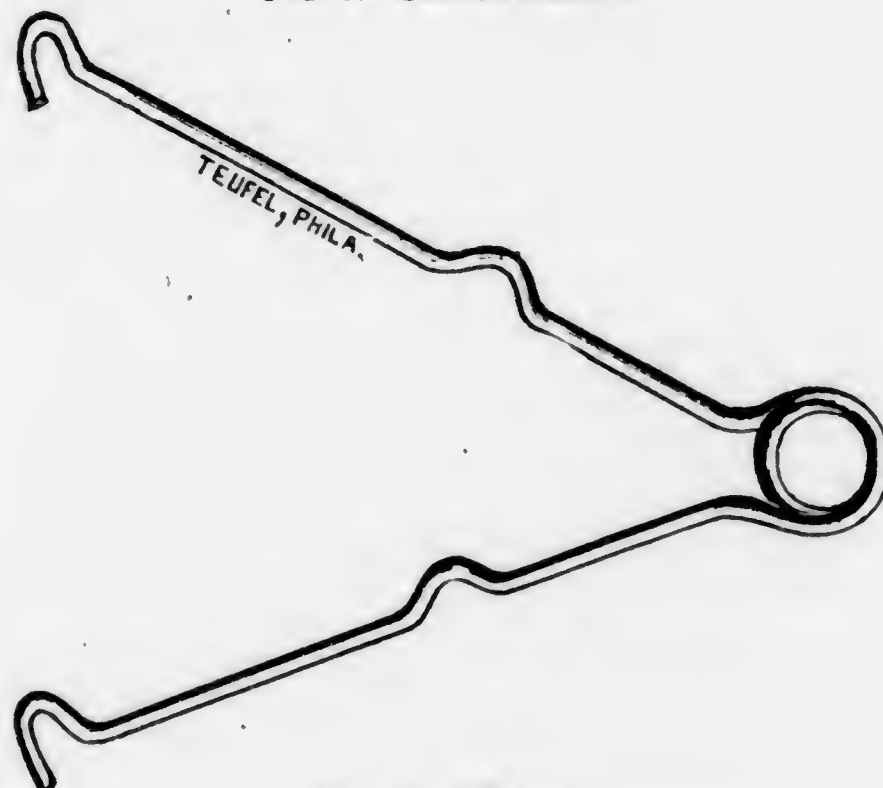


FIG. 7. Dilator.

stationed on the right side of the neck (the paralysis being nearly always left-sided), with the head extended, can outline with the fingers the different structures to be incised. Previous to the casting the skin should be shaved and washed with a 1-500 corrosive sublimate solution. The instruments required are a straight bistoury, razor-shaped bistoury, a bistoury curved laterally at an angle, two pairs of curved scissors, one

more curved than the other, a curved needle attached to a handle, an ordinary needle, a laryngeal dilator, large flat retractors, cartilage forceps, rat-tooth forceps, dressing forceps to hold the sponge to wipe out the blood, tampon canula, catgut, sponges, oakum, two yards of tape, and a bucket of carbolized water.\*

*First Stage.*—This consists in exposing the anterior surface of the larynx. With a bistoury, the skin is incised from the body of the thyroid cartilage to the third tracheal ring. The subscapulo-hyoid and sterno-hyoid muscles are then cut through on the median line indicated by a con-



FIG. 8. Curved Scissors.



FIG. 9. Cartilage Forceps.

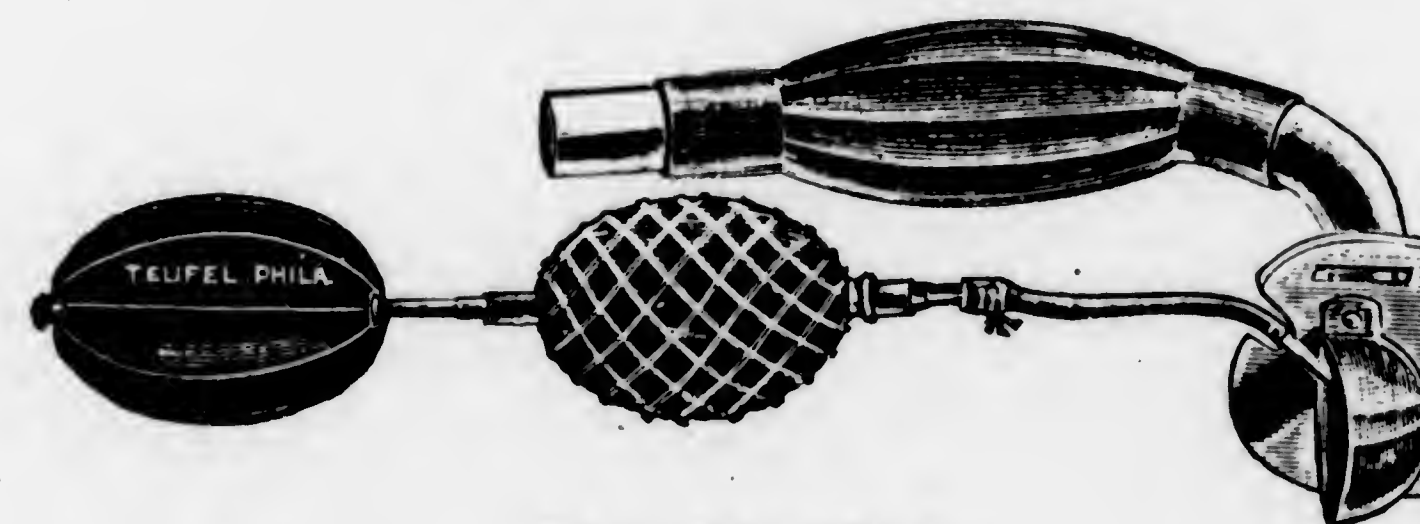


FIG. 10. Tampon Canula.

nective tissue raphe. With the retractors held by an assistant, the lips of the wound are now separated and the median line of the anterior face of the larynx carefully freed from all connective tissue, and all hemorrhage, which is usually insignificant, arrested by a cold-water sponge, or by ligation, before opening the larynx.

\* These instruments are manufactured by J. J. Teufel & Son, 114 S. Tenth St., Phila.



The *Second Stage* consists of opening the laryngeal cavity, as follows: Insert a sharp-pointed bistoury vertically through the crico-thyroid ligament, the cutting-edge being against the upper border of the cricoid cartilage; make a median incision, from before to behind, through the cricoid cartilage, the crico-trachealis ligament and the first two or three rings of the trachea. Separating the laryngeal wound to see that the extremity of the knife is on the median line, and not deviated to one side, so as to

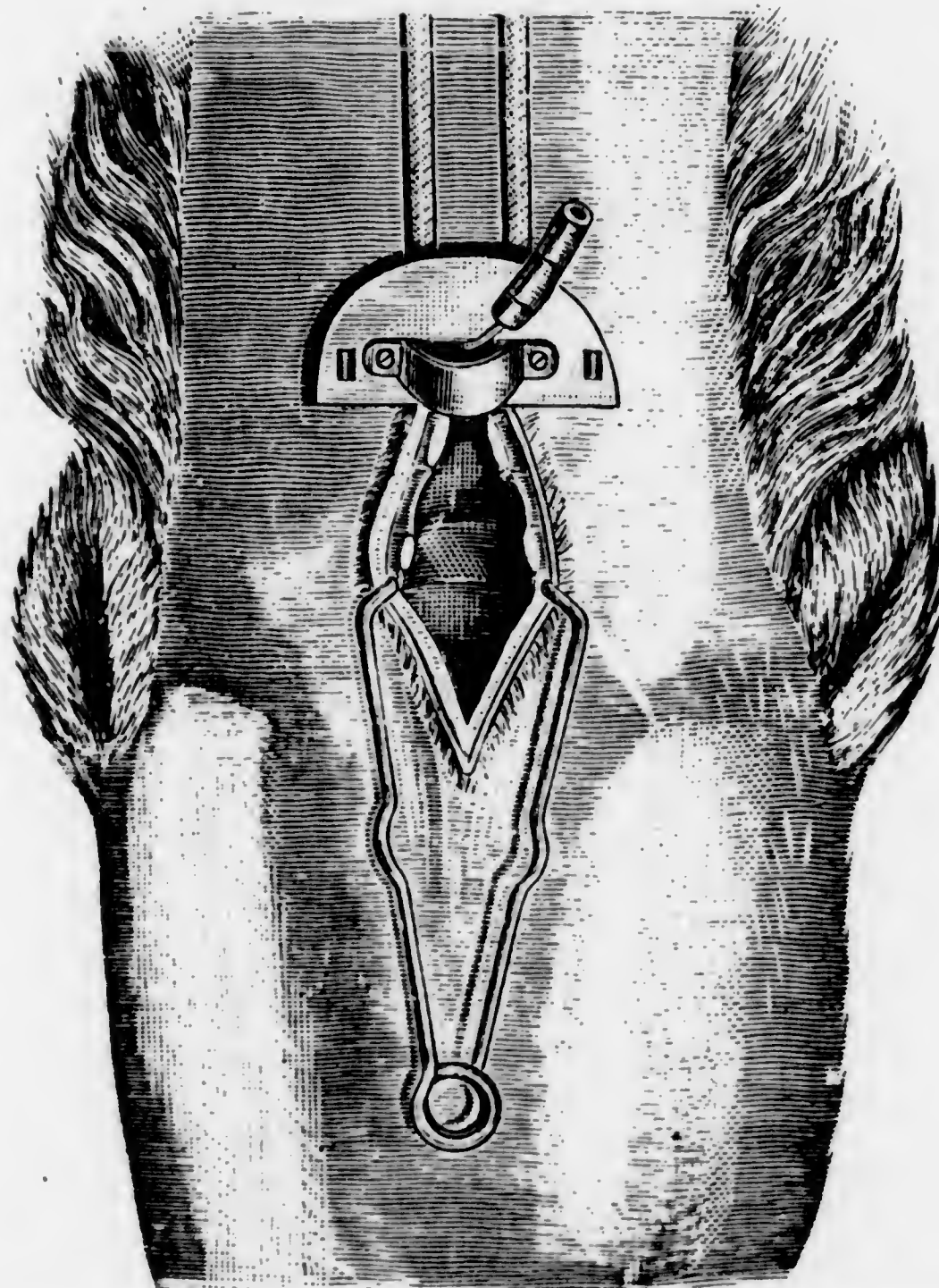


FIG. 11. Arytenectomy. The excision extends through the crico-thyroid ligament, the cricoid cartilage, the crico-trachealis ligament and the first two rings of the trachea. The second stage is completed, the canula and dilator are inserted.

injure the vocal cords, the crico-thyroid ligament is now cut through, upward to the body of the thyroid cartilage. Before blood of any quantity can pass down into the trachea, the tampon canula is quickly inserted and the rubber bulb inflated; the latter should, however, not make sufficient pressure upon the tracheal mucous membrane to cause necrosis and sloughing.

It is maintained in place by two pieces of tape, fastened to the eye on each side of the canula and held between the forearms by an assistant. With the retractors, the edges of the incision are separated, and the movements of the vocal cords observed before inserting the canula. The to-and-fro movement of the left cord is almost invariably diminished in varying degree—rarely both are at fault. This can be best seen by making the horse swallow, by touching the epiglottis with the finger, which is followed by a deep inspiration and abduction of the cords.

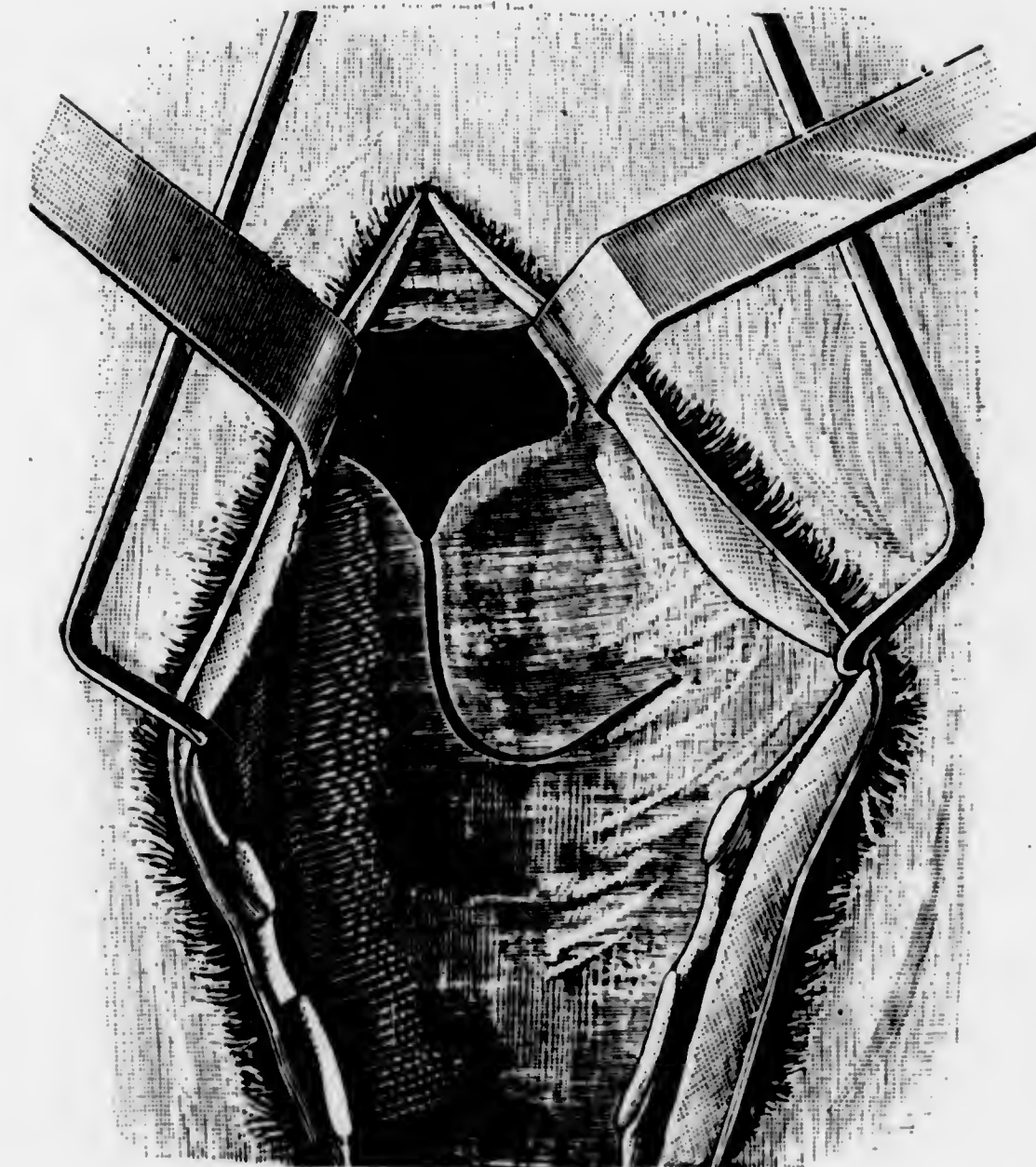


FIG. 12. Third Stage. Mucous membrane along the internal and the inferior border of the arytenoid cartilage incised.

*Third Stage.*—The third stage of the operation now begins, and consists of the excision of the left arytenoid cartilage, and the right also, if both are involved. I had intended to have some diagrams, but, in their absence, I have prepared a number of larynges from dead horses, which illustrate the successive steps in this procedure. The external laryngeal opening being widely dilated by the dilator and the retractors, and in some cases reflected light is useful, an incision is made with the razor-



shaped bistoury, along the internal border of the arytenoid, cutting through the mucous membrane and the inter-arytenoid ligament, and continued along its inferior border to the attachment of the vocal cord, or process vocalis.

With the same knife, the inferior border of the cartilage being held by the rat-tooth, or the cartilage forceps, the lateral crico-thyroid muscle is dissected away; the blunt end of the knife can be used to push away the muscular fibres from the cartilage. Strongly adducting the cartilage

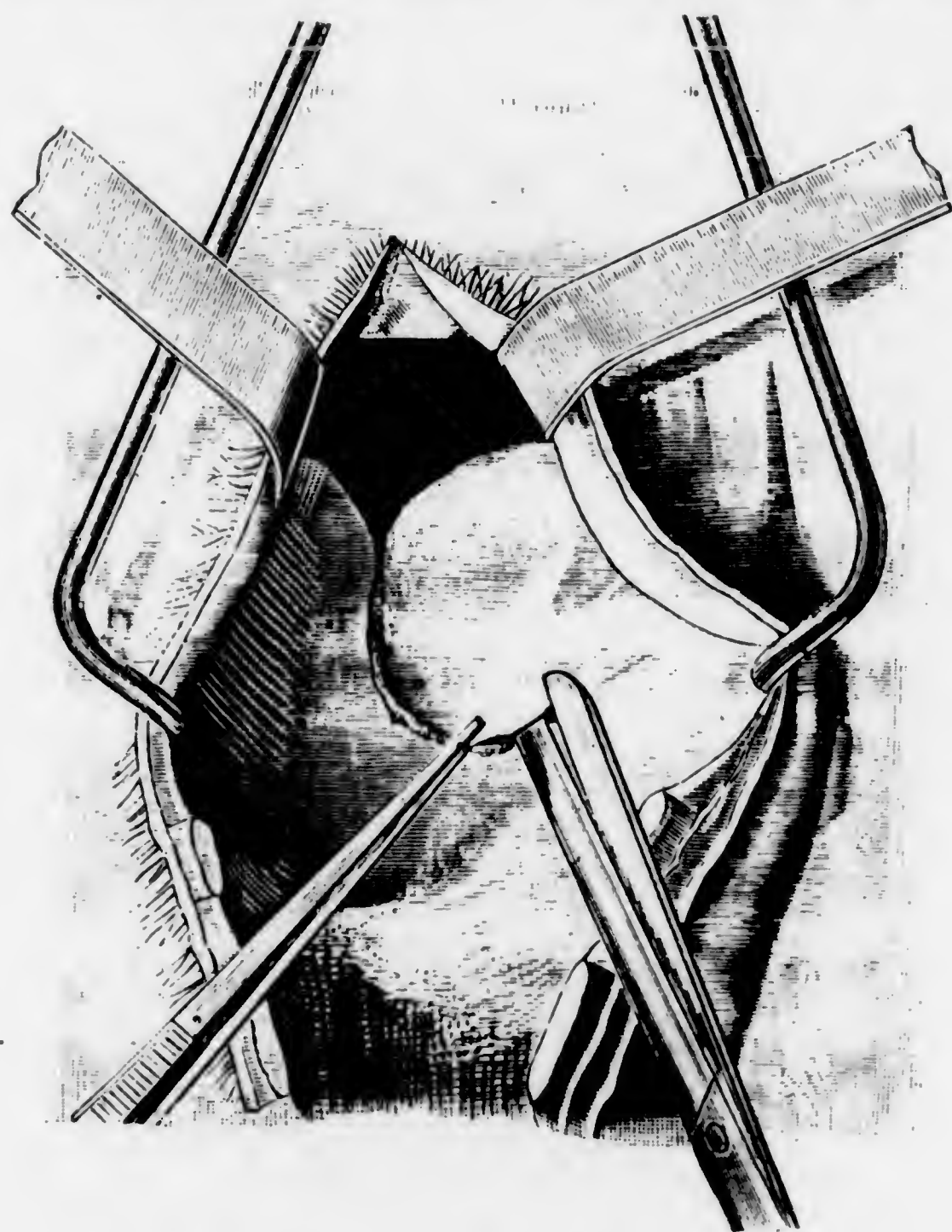


FIG. 13. Third Stage. Section of the vocal cord.

by a good hold with the cartilage forceps, the attachment of the vocal cord to the cartilage is cut through and the mucous membrane of the lateral ventricle carefully dissected from the external surface. This is done by cutting the mucous membrane closely along the anterior border of the arytenoid, to its superior extremity, with small cuts of the curved scissors. It is not necessary to insert the finger into the lateral ventricle; the latter should be saved, because it saves mucous membrane.

With the angularly-curved bistoury, the muscles on the external face, posterior to the lateral crest (thyro-arytenoid and arytenoideus), are now carefully dissected away by a pushing, rather than a cutting, movement. In this act, a branch of the thyro-laryngeal artery is sometimes cut, whose hemorrhage can be arrested by torsion with the artery forceps. The cartilage, being now almost free, excepting at its articulation, may be removed

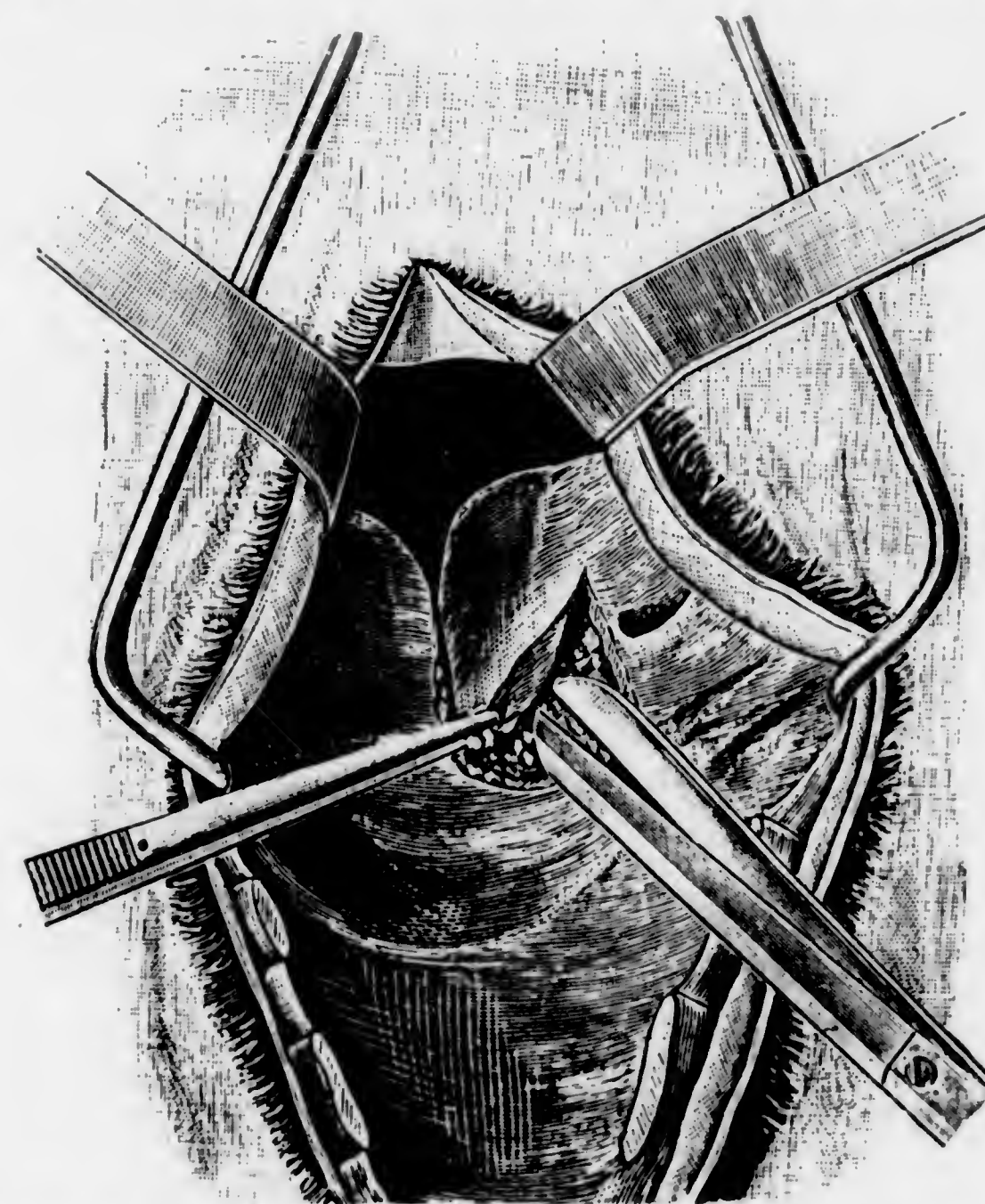


FIG. 14. Third Stage. Dissection of the anterior border and external surface of the arytenoid.

in two ways—by a transverse cut with the razor-shaped bistoury, at the crico-thyroid articulation, leaving a small portion of the extremity of the lateral crest, which projects on the posterior face of the cricoid; or, by a complete disarticulation from the cricoid. The former method is sometimes rather difficult from calcification of this part of the arytenoid, which frequently occurs, especially in old horses, in which the whole larynx may be calcified. It would appear, from post-mortem examinations, that calcification of the laryngeal cartilages plays a more important part in the ætiology of roaring than is generally credited to it. Complete disarticulation is preferable when there is extensive calcification, and,



even under normal conditions, cartilage granulating less easily than muscle, it will leave a surface granulating more readily and more kindly, although the operator will have more difficulty in accomplishing the disarticulation. The remaining attachments are cut away with the strongly-curved scissors, and the cartilage is lifted from its bed.

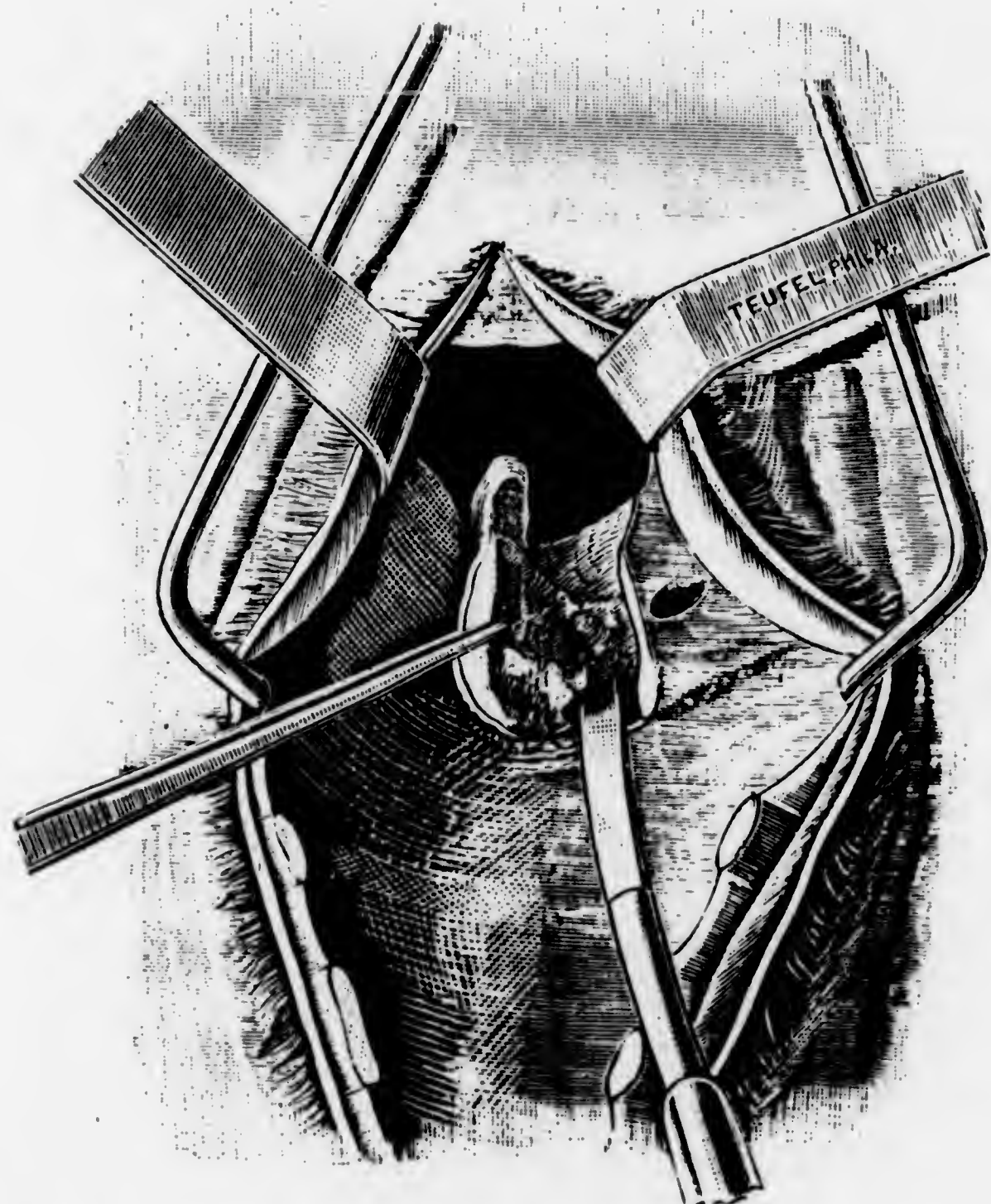


FIG. 15. Section of the arytenoid at its articulation with the cricoid.  
A branch of the thyro-laryngeal artery.

*Fourth Stage.*—The hemorrhage having been arrested with a sponge on the dressing forceps and cold water, or a 10 per cent. solution of chloride of zinc, and the blood carefully swabbed out, the edges of the mucous membrane are united with three or four sutures of cat-gut, according to the case, inserted with a strongly-curved needle attached to a handle for the purpose.

The wrinkled up mucous membrane on the posterior face of the larynx, at the entrance into the oesophagus, can be readily stretched out so as to cover the surface of the dissected muscles; in fact, this is one of the most important parts of the operation, because the mucous membrane covering the intra-laryngeal wound, prevents the formation of exuberant granulations, the great bane of the operation heretofore. The hemorrhage must be arrested in order to facilitate rapid union of the muscles with the mucous membrane, and the edges brought together as evenly as possible. The needle is inserted through the anterior edge, about five-

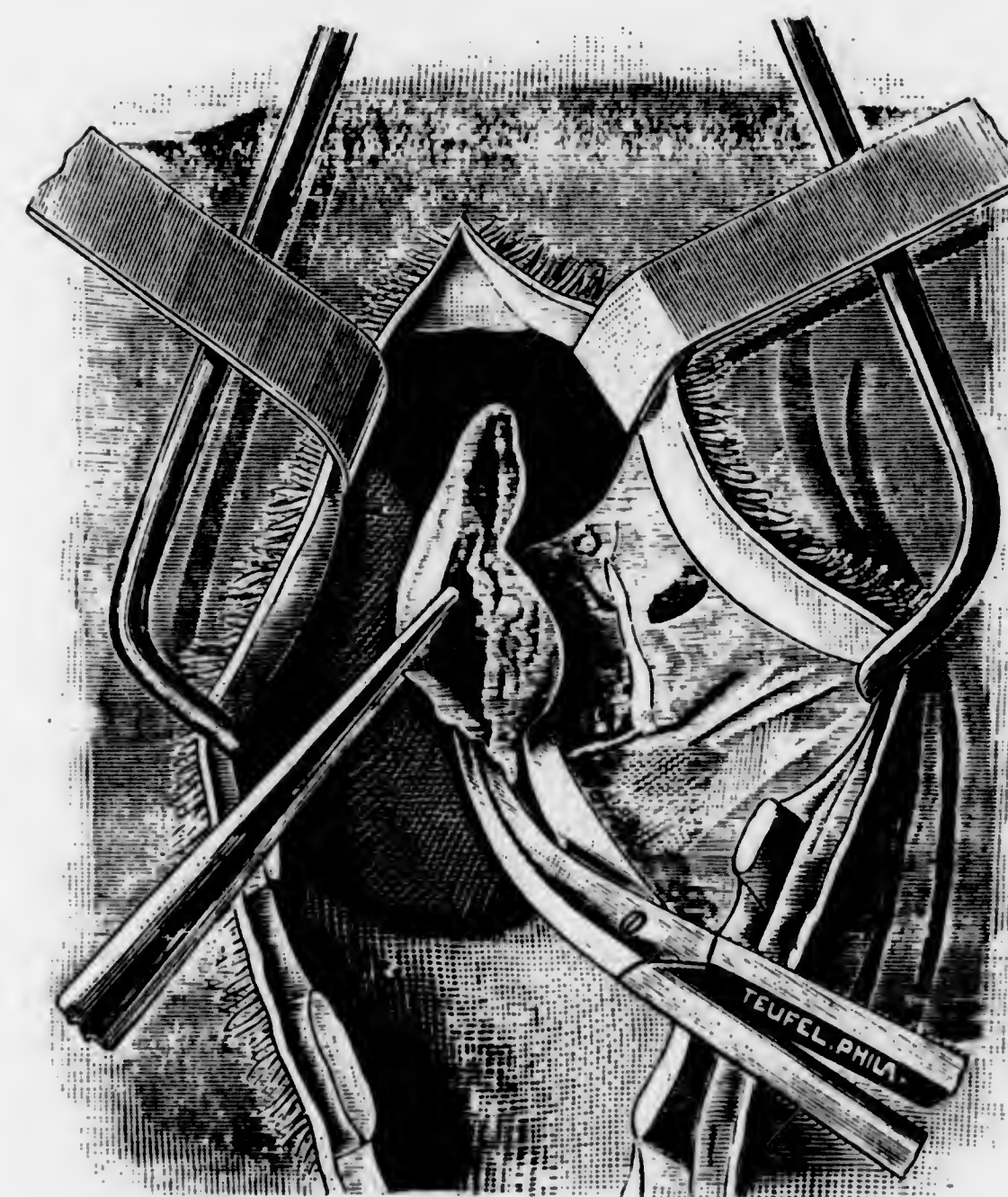


FIG. 16. Excision of the cartilage with the curved scissors.

eighths of an inch from the median line, from before to behind, and through the corresponding part of the posterior edge. With the forceps, one end of the thread is pulled through, the needle again withdrawn, and the thread cut; the others are inserted in the same manner and at about equal distances apart. They are then tied, but not too tightly to ulcerate through, either with the forefingers introduced into the larynx, or with the forceps, and cut off close.



The parts, being thoroughly cleansed, are sprinkled with equal parts of iodoform and tannic acid, and the laryngeal cavity packed with small pads of oakum, secured with a string passing through the external opening and fastened around the neck, to prevent their displacement. Blood-clots in the pharynx can be washed out through the nose with a syringe. The external wound is closed with three sutures, passed through the skin and muscles; the one nearest the canula should be drawn tightly to prevent its displacement. The tape in the eyes of the canula is fastened around the neck to prevent displacement, and the animal is allowed to rise and turned into a box-stall.

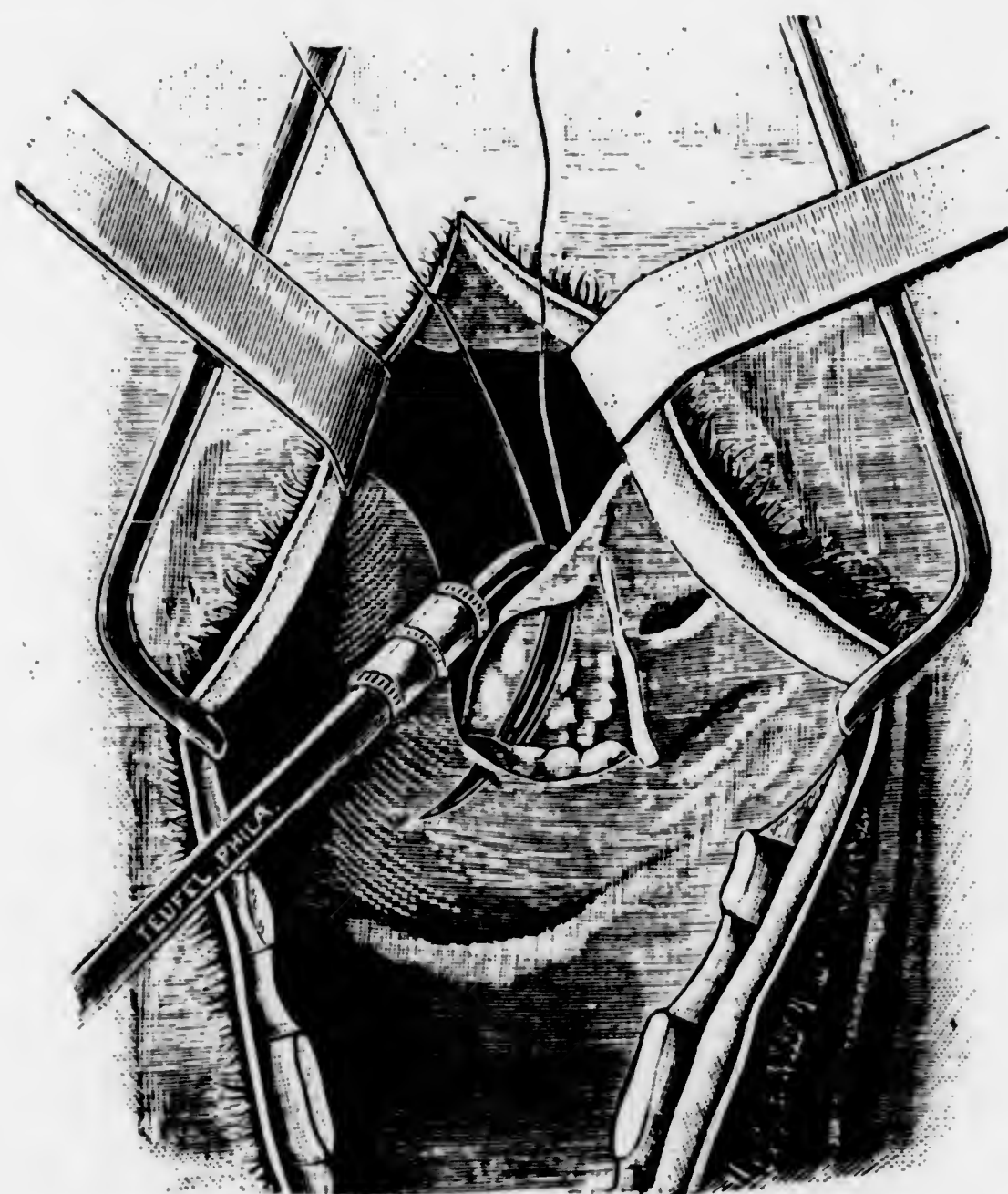


FIG. 17. Fourth Stage. Suturing the mucous membrane. The needle should include more of the posterior wall than is represented in the figure.

*After-Treatment.*—During the first twenty-four hours the animal may receive a few swallows of water, but food should be withheld. The next day the external sutures and the oakum packing of the larynx are removed, and the blood-clots and pus, if there be any, swabbed out with a small sponge, securely fastened to the end of a stick; the canula is then removed. The rubber bulb is very often found collapsed. A new

canula is inserted and inflated as before. The animal is made to drink water from a bucket to make him hold his head low, and the larynx washed out with a 1-1000 solution of corrosive sublimate, injected with a syringe, followed by the application of iodoform and tannic acid. He is allowed to eat soft hay. The respiration may be slightly noisy, but it will disappear in a few days. The same treatment is repeated the third day. After this, the canula is withheld, and the treatment consists of daily cleansing of the external wound and the application of iodoform and tannic acid as before. Oats and bran can also be given. Water may escape from the wound for several days, which is of no consequence, but rather washes

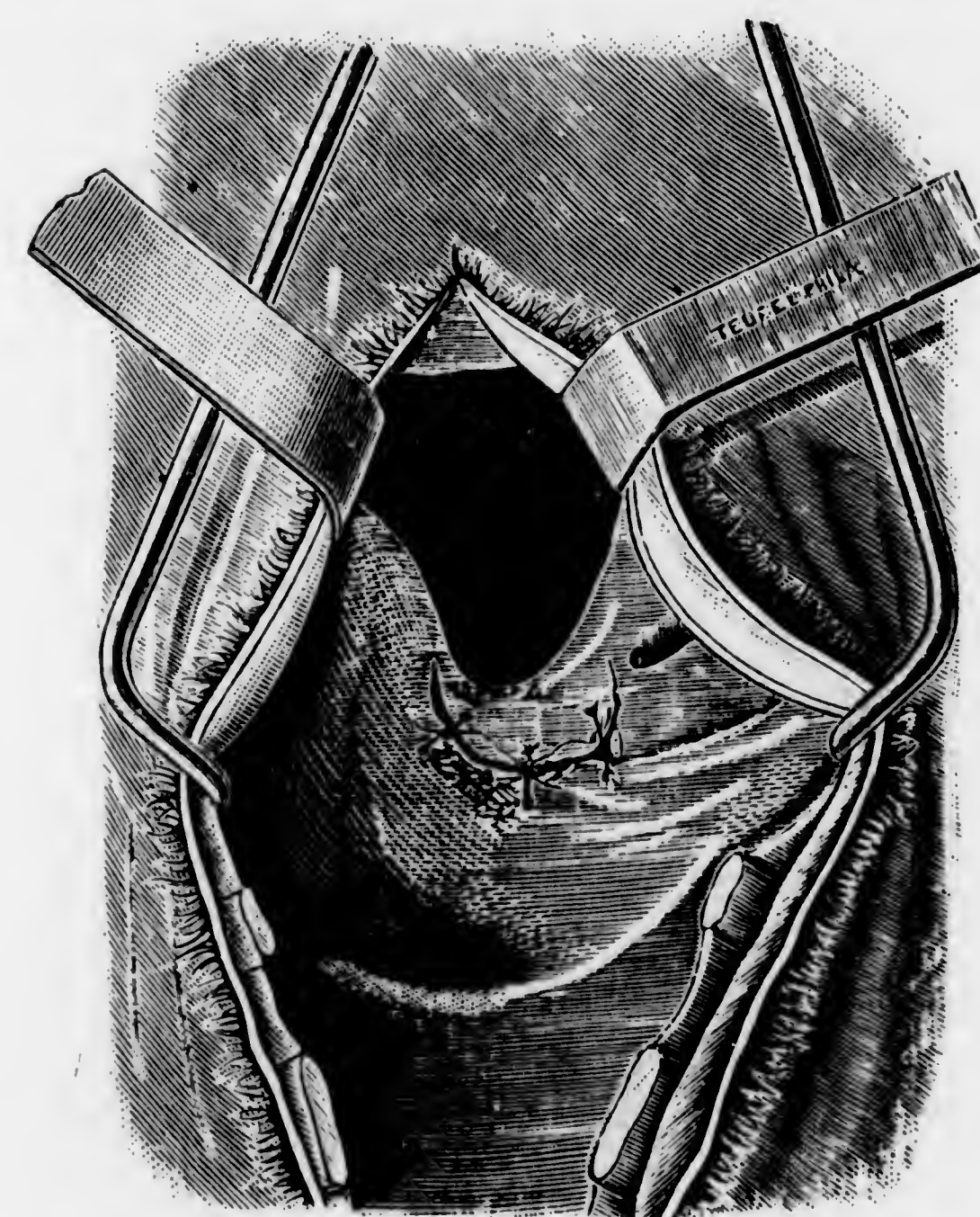


FIG. 18. The suturing is completed. Position of the three sutures; they should be parallel to each other and to the median line. (The inner one is here too oblique.)

out the larynx. The internal parts should not be too much explored with the fingers; this will only irritate the surface without gaining much. The constitutional symptoms are very mild, and the temperature rarely rises to  $39^{\circ}$  to  $39.5^{\circ}$  C.



In from three to four weeks the external wound closes, and, if everything progresses favorably, the internal wound will have cicatrized. The patient is ready to perform his usual work in from six to eight weeks, unless in the case of running and trotting horses, which should have a rest of three months. In several cases on which I have operated experimentally and afterward killed, no alteration, except the form of the glottis, could be seen, and the wound was covered with a normal mucous membrane.

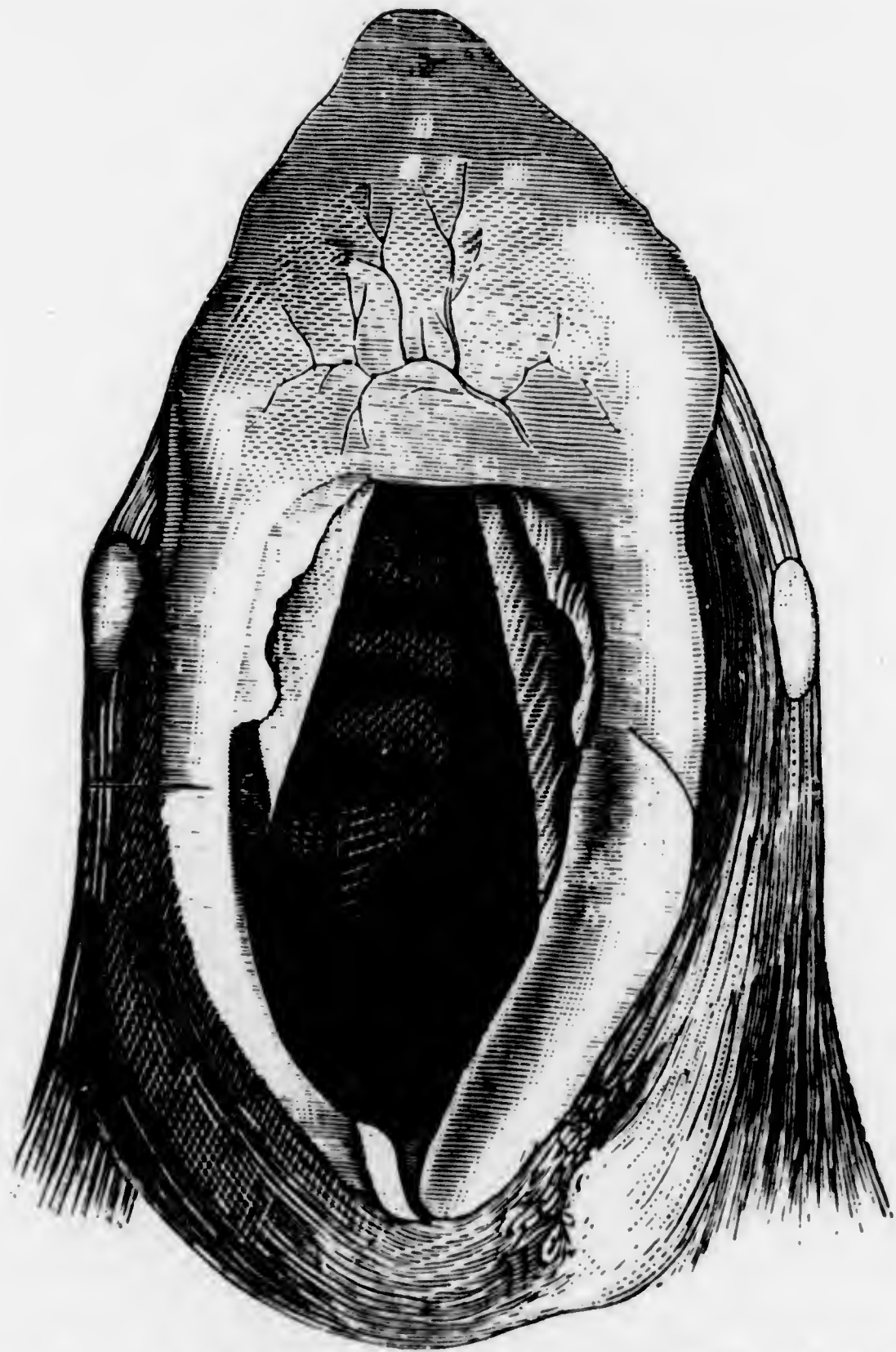


FIG. 19. Superior opening and glottis of the larynx of a roarer which died, eight days after the operation, from pneumonia. P, Wound in process of healing.

Sometimes the healing process requires more time—there may be a cough, discharge from the nose, and slight respiratory noise during exercise. These symptoms may disappear in three to six months. As long

as there is a discharge, the cicatrization is not completed. One of my own cases, sent to me by Dr. Wm. H. Ridge, made a complete recovery in four weeks.

The results of arytenectomy have varied in the hands of different operators. While it may be complicated by traumatic pneumonia and other accidental conditions, the main barrier to its success has been "proud-flesh." For this I do not believe that we should blame the operation itself, but rather the manner in which it was performed. It has been my experience that when a large portion of the arytenoid was left in situ, exuberant granulations almost invariably followed; when only a small portion of it was left, or when it was completely disarticulated, the wound healed without "proud-flesh." It is easy to see that the avascular structure of the cartilage, as well as the constant movements of the portion which is left, will act as a source of irritation and prevent cicatrization.

There are no statistics to compare the cures and the non-cures. The success of Professor Möller has been remarkable. Out of one hundred cases, he observed ninety cures and ten failures, the latter being due to traumatic pneumonia and other inter-current accidents, of which eight occurred in his first thirty cases. In only one instance were the symptoms aggravated by the operation. Of three cases in which I excised the whole of the arytenoid, all recovered. Other surgeons operated successfully, but many of their cases have not been reported. It is an operation which, above everything else, requires a good anatomical knowledge and practice, in order that it may be performed with skill and success. While its success is not yet established, it is, however, sufficiently promising, and the benefits which could be derived from it appear sufficiently remunerative, that the veterinarian should give it a thorough trial and report the results to his co-laborators before allowing it to fall into disuse. Since this paper was read, I have learned that another one of my cases, which had passed from my observation, made a successful recovery, making a total of four cures out of six operations; the two unsuccessful ones were the first two on which I practiced the operation.



## The Veterinarian—Intellectually, Socially and Morally.

BY JAMES A. WAUGH, V. S.,  
ALLEGHENY, PA.

~~the~~ **American** veterinarians have an extensive field and excellent opportunities for intellectual training in the various branches which form the curriculum leading to a modern veterinary education. The contributions to our veterinary periodicals, and additions to our literature, prove that active minds are working earnestly and energetically to promote and advance the best interests of our profession, and we trust that in course of time—probably within a quarter of a century—we will have an established American veterinary literature equal to that of any nation in the civilized world.

We now have nineteen veterinary schools and colleges established, founded, chartered or incorporated in the United States and Canada, and each and every one has a number of students. It appears there are a great variety of veterinary schools and colleges on this Continent, and some are conducted legitimately, in the interest of students and the profession, while others are managed merely as money-making concerns, for personal profit and aggrandizement of certain individuals. A small army of veterinarians are employed as scientific instructors, lecturers and professors in these various institutions. Ambitious students can select a long three-years' course of instruction, or a short two-winters' session course, in order to earn or win the much-coveted veterinary diploma.

A few years ago a great many students graduated and received nice diplomas after attending a veterinary college considerably less than two winter sessions. There appears to be two active elements in the interest of veterinary intelligence and education in this country, and one advocates a superficial and short course of instruction and education, while the other insists on a very thorough and complete course. Therefore, in view of these facts and existing conditions, it is not surprising to find some envy, jealousy and a lack of harmony among the majority of our profession on

this Continent. However, we note the same conditions exist in the medical profession. The American Medical Association has demanded a higher standard of medical education in the United States, and many medical schools and colleges have increased their faculty and extended their curriculum in response to this demand. The United States Veterinary Association is carefully considering the feasibility of advocating the extension of the curriculum and increase of faculty in several of the veterinary schools and colleges in this country to a three years' graded course, with not less than four practicing veterinarians in the teaching faculty of each school or college. This appears to be a move in the right direction, and ought to include clinical instruction for all veterinary students. It seems inconsistent and unreasonable for some college professors to deliver a course of stereotyped lectures every session to all classes of students irrespective, to junior or senior students, or first, second or third-year students. A system of graded instruction, with examinations at the close of each session, and due credit for all work performed, would encourage and stimulate every student to endeavor to accomplish the best possible results in individual cases. There are no means of computing the errors of poorly-instructed veterinary graduates, but suffice it to mention that equine surgery often demonstrates serious faults in operations, especially when paracentesis abdominalis induces abscesses, which finally cause death of the unfortunate patients. The Bureau of Animal Industry, United States Department of Agriculture, employs about eighty veterinarians, among them some of the ablest in the world, and their official reports inform us of their scientific investigations and researches, deductions and results. Intelligent sanitary inspection of our export dressed meat-products and live-stock has opened the markets of almost every nation in the world for the sale of the above-named articles, and this causes a constant flow of money into our country from foreign lands, which benefits all classes, both at home and abroad. This forcibly illustrates the value of veterinary science applied intelligently in business and commerce. The dairy and meat-supply of our cities and towns ought to be carefully inspected by a corps of intelligent and qualified veterinarians. A properly organized bureau of animal industry would prove of inestimable value in connection with each State Board of Agriculture. It will require intelligent legislation to enact the necessary laws and regulations for this work. A number of our States and Territories have wisely enacted excellent laws for the suppression of contagious and infectious diseases in domestic animals, while others have done almost nothing, and it becomes our duty to take some action and consider this matter in our own State. The agricultural colleges and experiment stations in various parts of our country employ a number of veterinarians as investigators, experimenters and teachers, lecturers and professors, and



many agricultural and veterinary students receive modern veterinary instruction and education in these colleges. It is sincerely hoped that this general diffusion of veterinary information and knowledge will produce excellent results among the farmers and live-stock breeders throughout the country.

The intelligent public is learning to appreciate the value and importance of modern veterinary science in contrast to the crude and barbarous methods formerly practiced by ignorant and superstitious farriers and charlatans. The enactment of intelligent and useful legislation, governing and regulating the practice of veterinary medicine and surgery, denotes progress and public appreciation.

We must not ignore the efforts and energy of the many self-educated veterinary practitioners of our country, and we should cheerfully assist them freely with advice to select and study our standard text-books, as well as our veterinary journals, and, if possible, attend some good veterinary school or college. The formation of local and State veterinary medical associations indicate fraternal and intelligent advancement in every way.

State and territorial veterinarians are an energetic and educated class of men, who are doing good sanitary work in the interest of live-stock owners and the public health.

It is evident from the above resumé that American veterinarians are a very industrious and energetic class of men, who are intellectually equal to other members of the learned professions, and it is gratifying to note progress in all parts of our country.

### Socially and Morally.

A great many members of our profession occupy good social positions in their respective communities, and are well received in the best social circles of polite society. This matter probably depends mainly on personal ability and accomplishments, environments, locality, etc. Students and the younger members of the profession should aim to acquire good manners and cultivate a fair address; learn business methods, be reputable members of society and good citizens. We sincerely recommend all regular and honorable members of our profession to join the State and National Association, where their votes and influence can be used to good advantage, in promoting necessary legislation and laws. Morally, we should observe the code of ethics of our Association, and use every honorable means to encourage and assist the younger and struggling members of our profession, and we ought to act conscientiously in advising students

in regard to selecting a school or college; and we should aim to maintain a good business standing in the community.

This country is now well supplied with talented and well-qualified veterinarians, and we unhesitatingly enter an earnest protest against the custom of editing and conducting veterinary columns of queries and answers in our agricultural and live-stock press. No one can deny and prove that the above-mentioned "queries and answers" are not injurious to the interests of rural practitioners and live-stock owners. It exerts an especially baneful influence on the welfare of young graduates, and rarely benefits anyone except the editor in a very small way. It is a very reprehensible practice for the principal of a veterinary college to edit and conduct the above-named columns. Students and others ought to consider this matter and enter a positive protest in a practical way.

The manufacture and sale of proprietary medicines prove injurious to legitimate practice, and we should religiously abstain from writing endorsements for promoting these sales and encouraging those irregular methods of practice.



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